ΑΣΤΡΟΝΟΜΙΑ.— **Photoelectric Photometry of Selected Galactic Cepheids. II. Two-Color Observations of 12 Cepheid Variables,** *by K. Bahner and L. N. Mavridis* *. Ἀνεκοινώθη ὑπὸ τοῦ Ἀκαδημαϊκοῦ κ. Ἰ. Ξανθάκη.

1. INTRODUCTION

The determination of as complete and accurate as possible light and color curves of cepheid variables could be of considerable interest, for example from the following points of view : a) For a more thorough study of the relations existing between the different characteristics of the cepheid variables and their period. These relations could then be used for a better separation between the population I and population II cepheids in the dick of the Galaxy as well as for an eventual subdivision of these two groups of cepheids into further sub-groups. b) For a control of the stability of the periods, and, after reobservation of the same stars at a later time of the form of the light and color curves. This information could be of great value for the determination of the time-scale of the cepheid phenomenon.

As a contribution to this way of approach, an effort has been made to determine complete and accurate light and color curves (B, V) for the following 18 galactic cepheids with $2^d < P < 17^d$ (Bahner and Mavridis, 1960): RT, RX, SY Aur; RW Cam; SU Cas; VZ, CD Cyg; V, X, Y, Z, RR, BG Lac; RS Ori; SV, AW Per; U Vul (as the period is nearly equal to 8^d the light and color curves are incomplete); TU Cas (numerous observations; the cepheid shows beat phenomena).

In the first paper of this series (Bahner and Mavridis, 1971), hereafter called Paper I, a description was given of the methods of observation and reduction used during the measurement of all the 18 cepheids mentioned above followed by the results obtained for the 6 cepheids CD Cyg; X, Z, RR Lac; U Vul and TU Cas.

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In the present paper the results obtained for the remaining 12 cepheids i. e. the cepheids RT, RX, SY Aur; RW Cam; SU Cas; VZ Cyg; V, Y, BG Lac; RS Ori; SV, AW Per as well as a preliminary discussion of the entire material is given. A more thorough discussion of the same material as well as an application of this material for the study of the stability of the periods of these cepheids is underway. It should be noted that the 5 cepheids CD Cyg; X, Z, RR Lac and U Vul were reobserved during the years 1967 - 1970 at the Stephanion Observatory and the results obtained were used for a control of the stability of the light and color curves of these stars (Asteriadis *et al.*, 1974).

2. RESULTS

The results obtained for the 12 cepheids RT, RX, SY Aur; RW Cam; SU Cas; VZ Cyg; V, Y, BG Lac; RS Ori; SV, AW Per are given in Table I. The columns give the heliocentric Julian Date, the phase computed with the help of the epoch and period given in Kukarkin *et al.*, (1969), the V magnitude and the B - V color. A colon (;) indicates that the value given is of lower weight. The corresponding light and color curves are given in Figures 1 - 12.

3. DISCUSSION OF THE RESULTS

In Table II following quantities are given for each of the 18 cepheids observed but the anomalous cepheid TU Cas: 1) The name of the cepheid. 2) The period as given by Kukarkin *et al.*, (1969) and the corresponding value of logP. 3) The galactic coordinates l, b. 4) The average $\langle V \rangle_{int}$ of the V magnitude. In order to calculate this quantity the light curve has been converted into one of intensity versus time, planimetered to find the average intensity over the cycle and this average intensity has been converted into a magnitude. 5) The maximum and minimum values of the V magnitude V_{max}, V_{min} and the corresponding amplitude $\Delta V = V_{min} - V_{max}$. 6) The average $\langle B - V \rangle_{mag}$ of the (B - V)

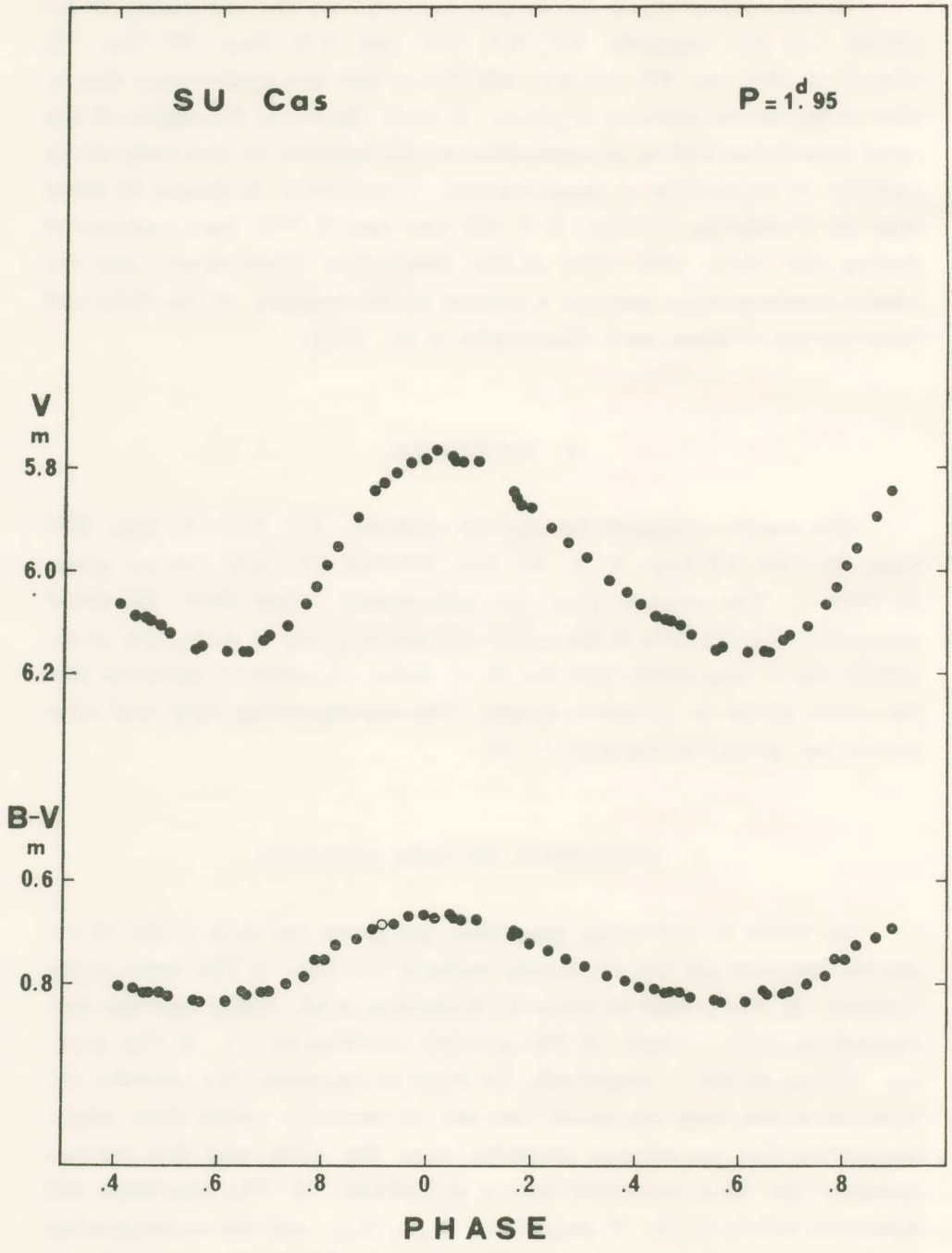

Fig. 1. Light and color curve of the Cepheid SU Cas

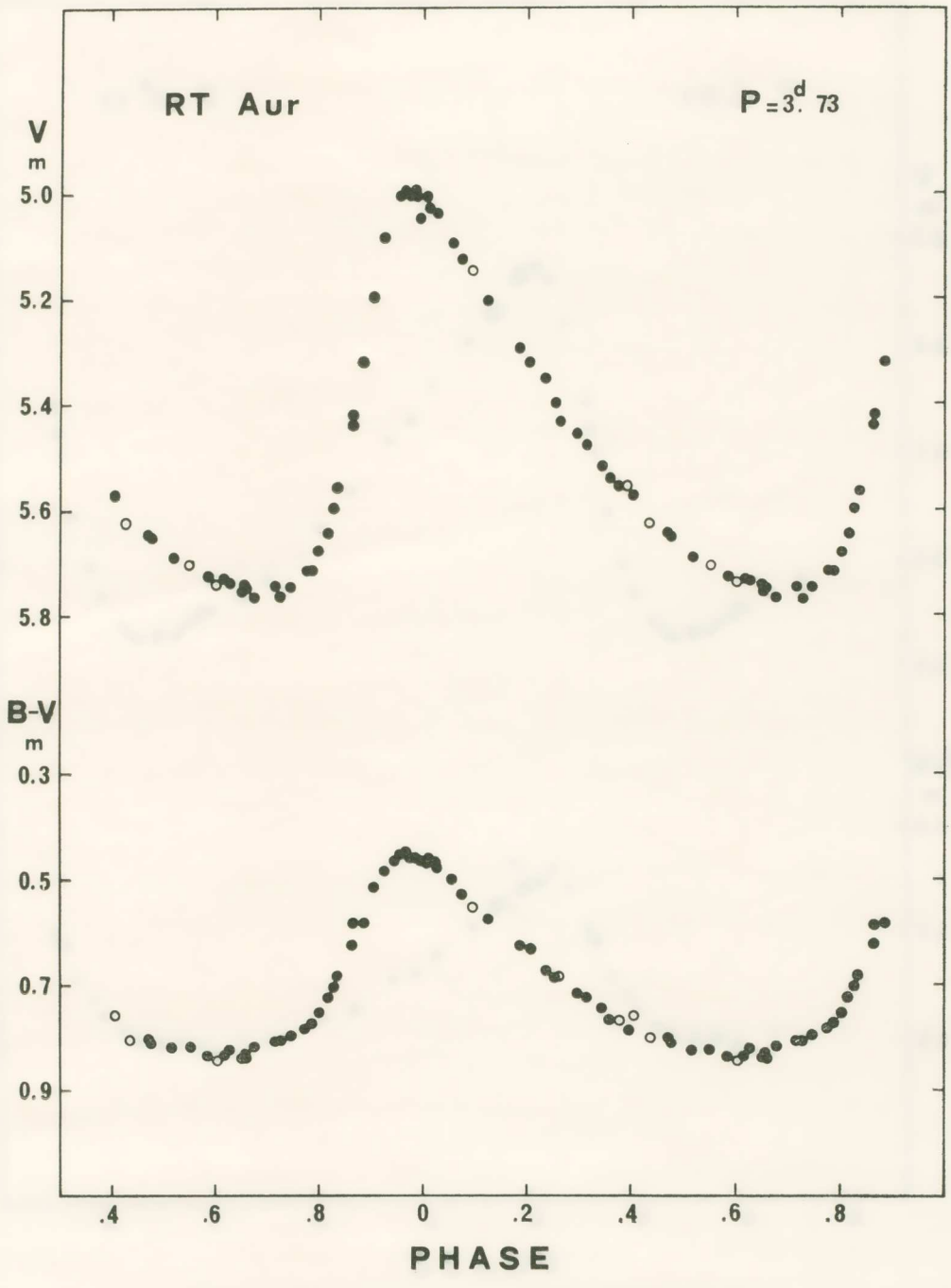

Fig. 2. Light and color curve of the Cepheid RT Aur.

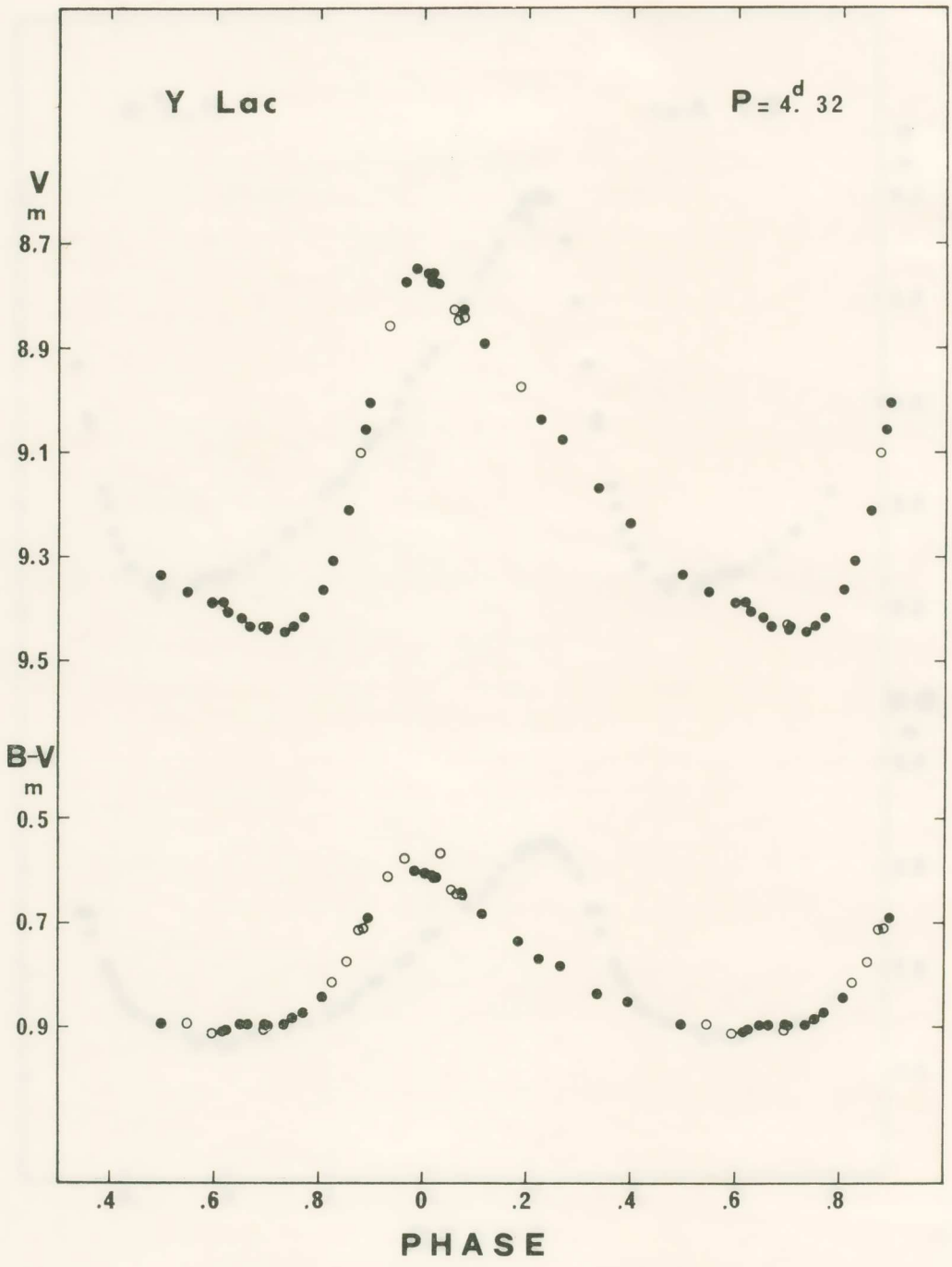

Fig. 3. Light and color curve of the Cepheid Y Lac.

Fig. 4. Light and color curve of the Cepheid VZ Cyg.

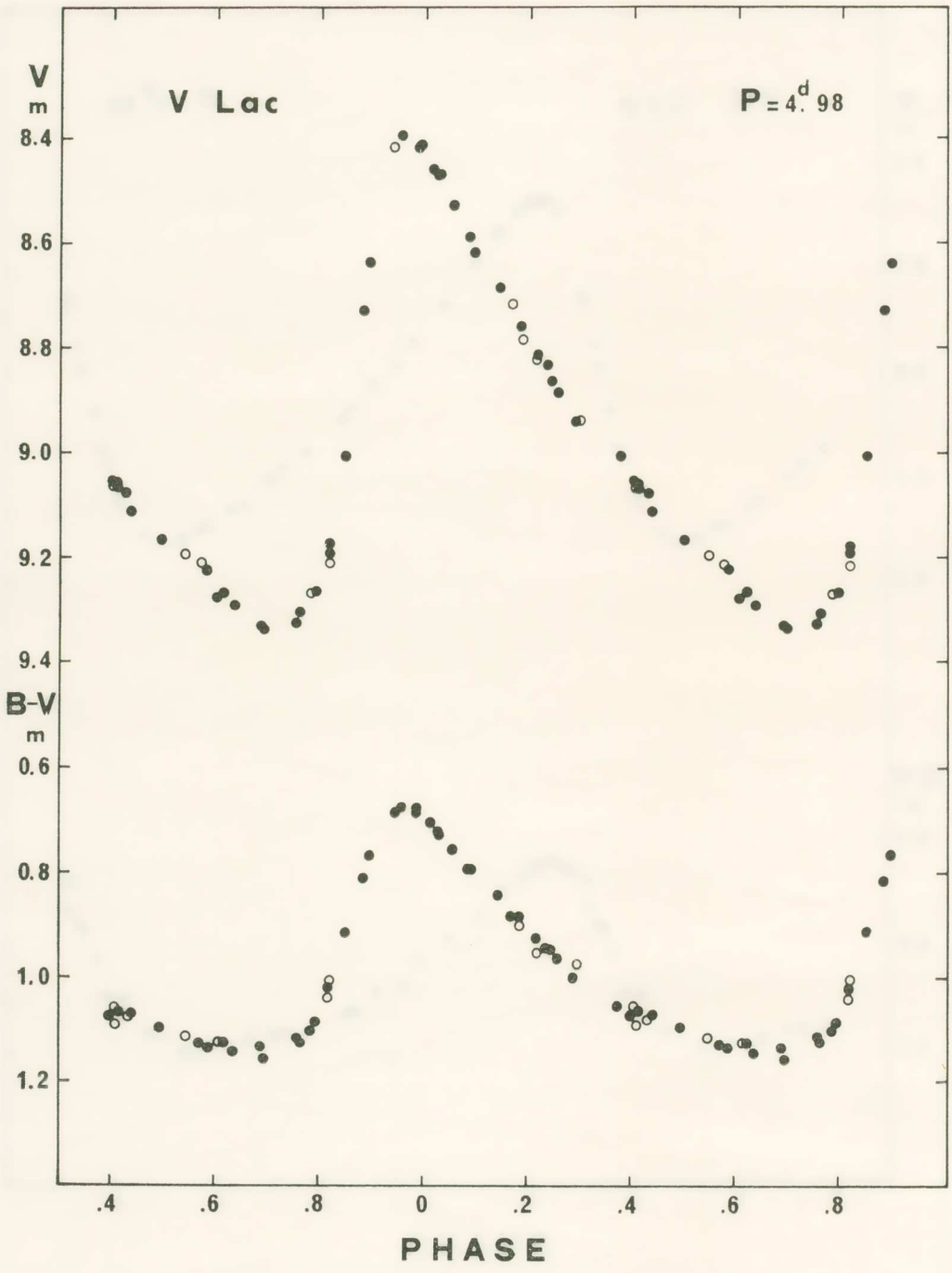

Fig. 5. Light and color curve of the Cepheid V Lac.

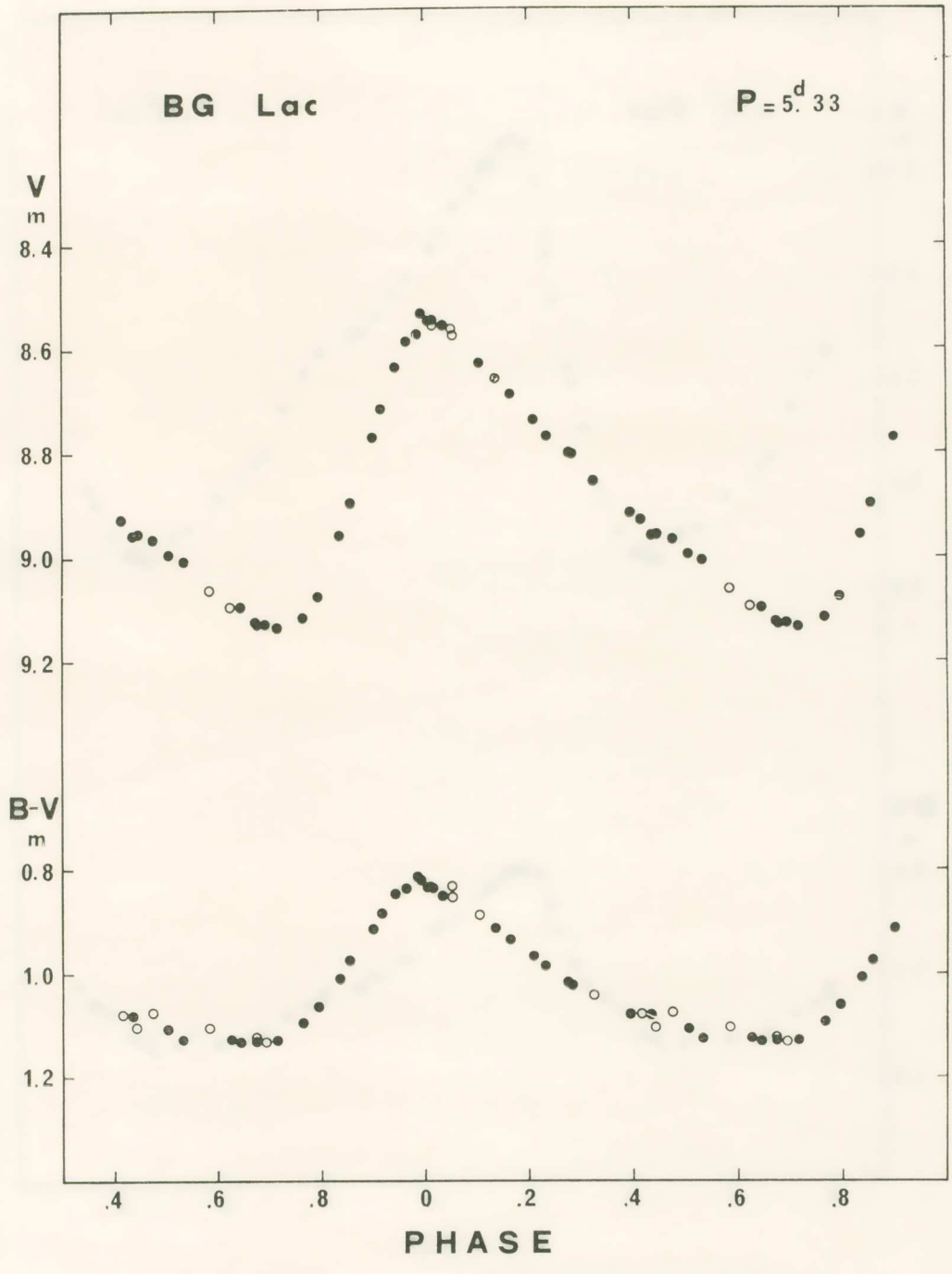

Fig. 6. Light and color curve of the Cepheid BG Lac.

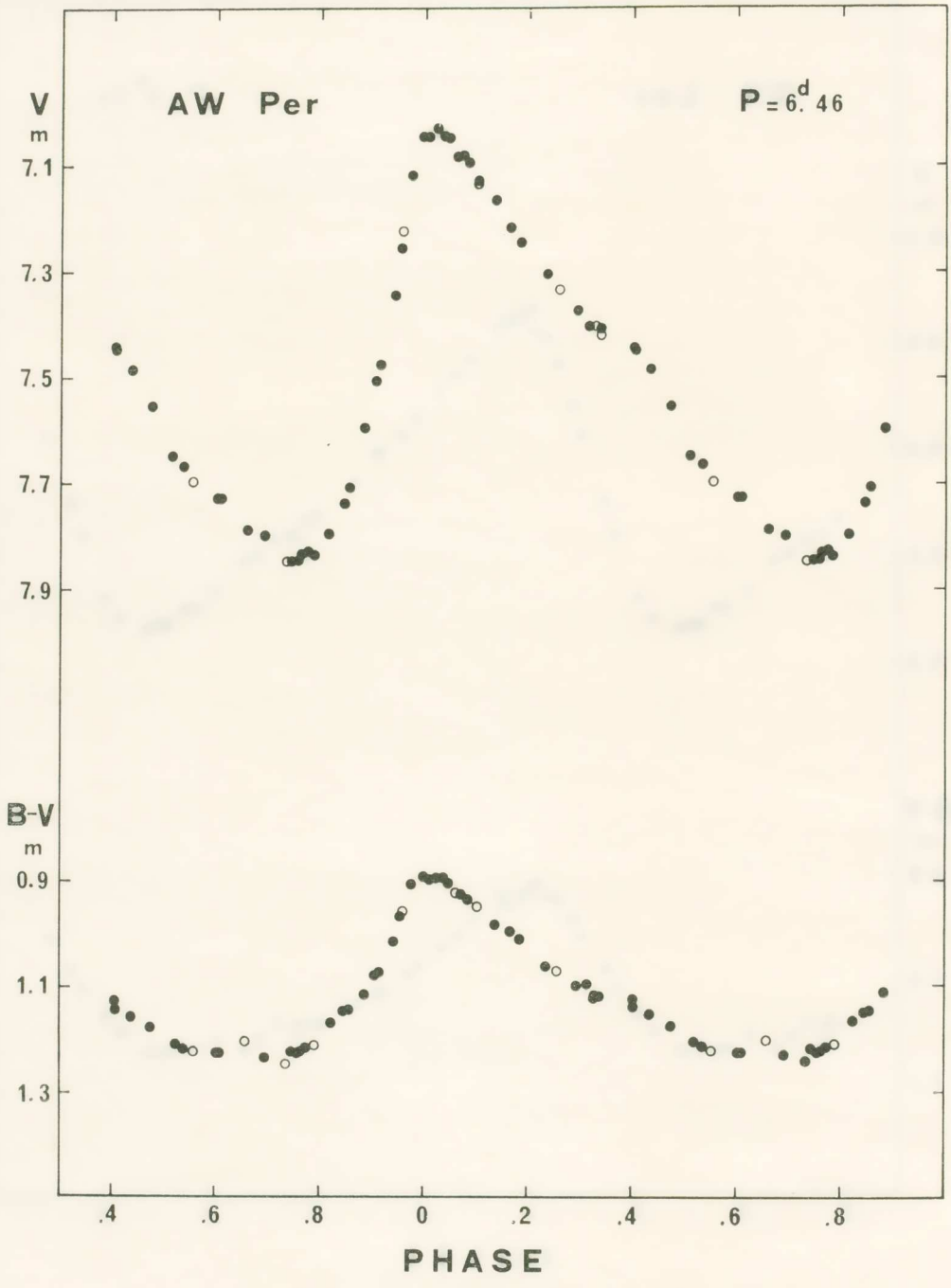

Fig. 7. Light and color curve of the Cepheid AW Per.

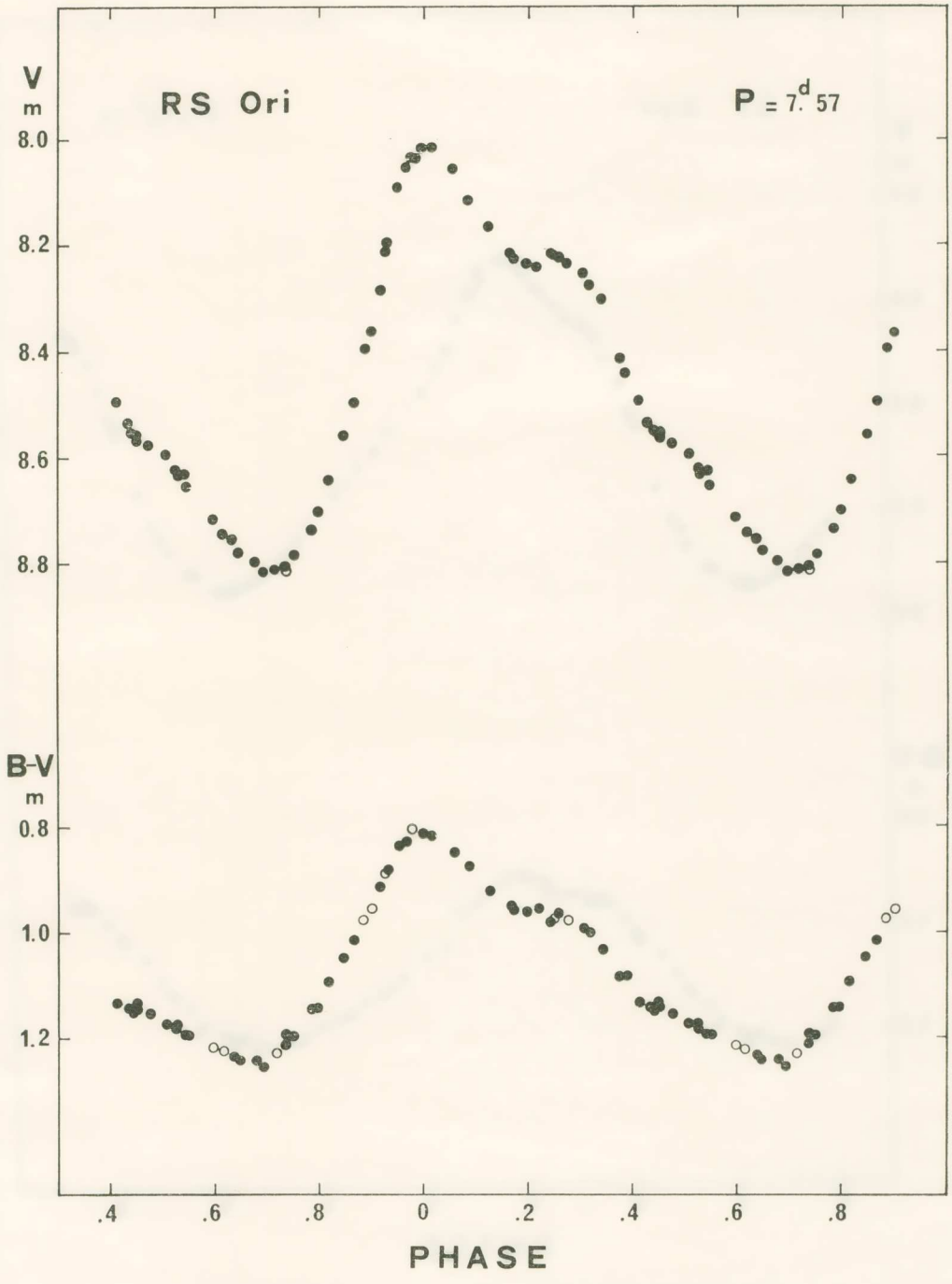

Fig. 8. Light and color curve of the Cepheid RS Ori.

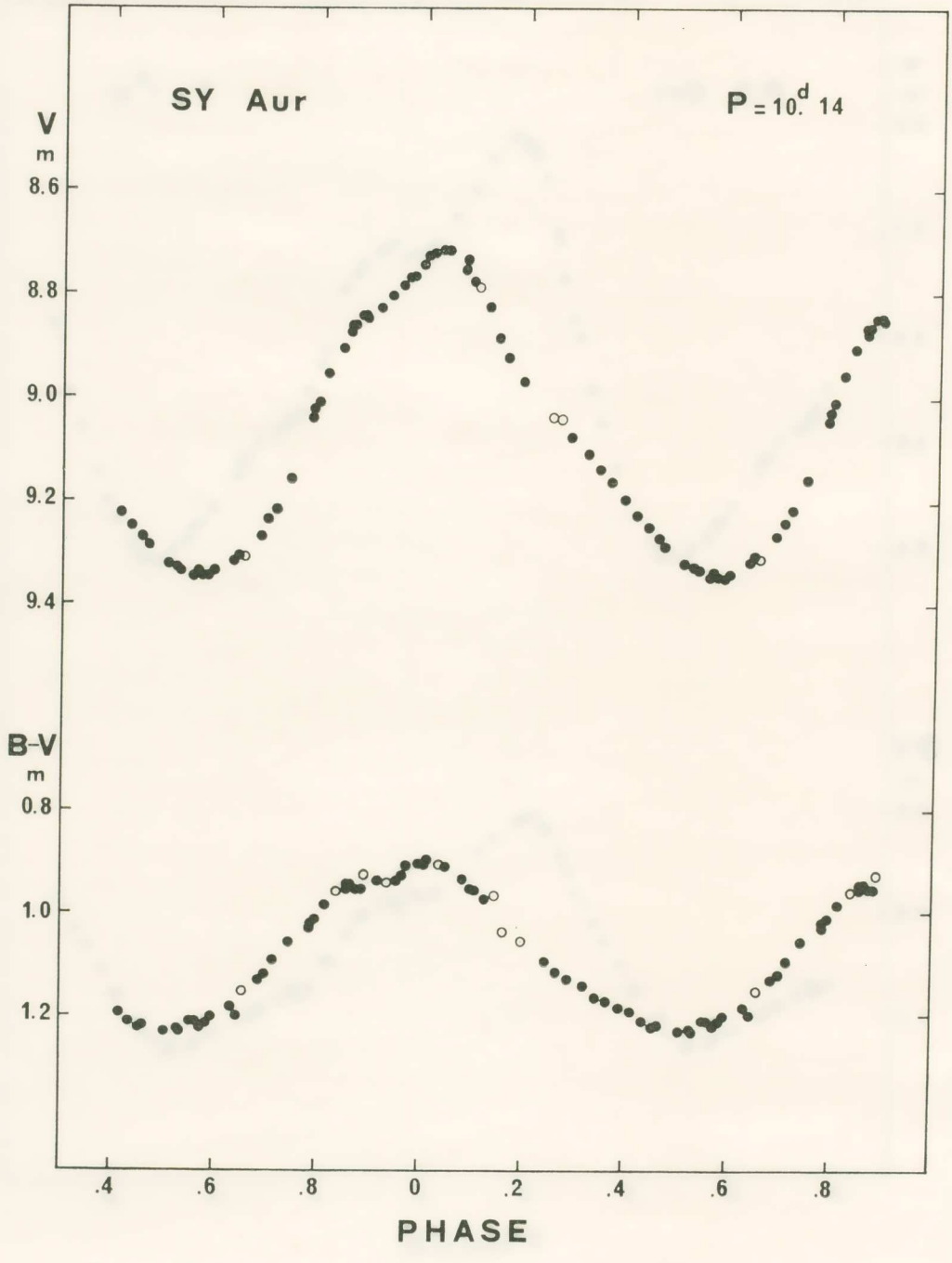

Fig. 9. Light and color curve of the Cepheid SY Aur.

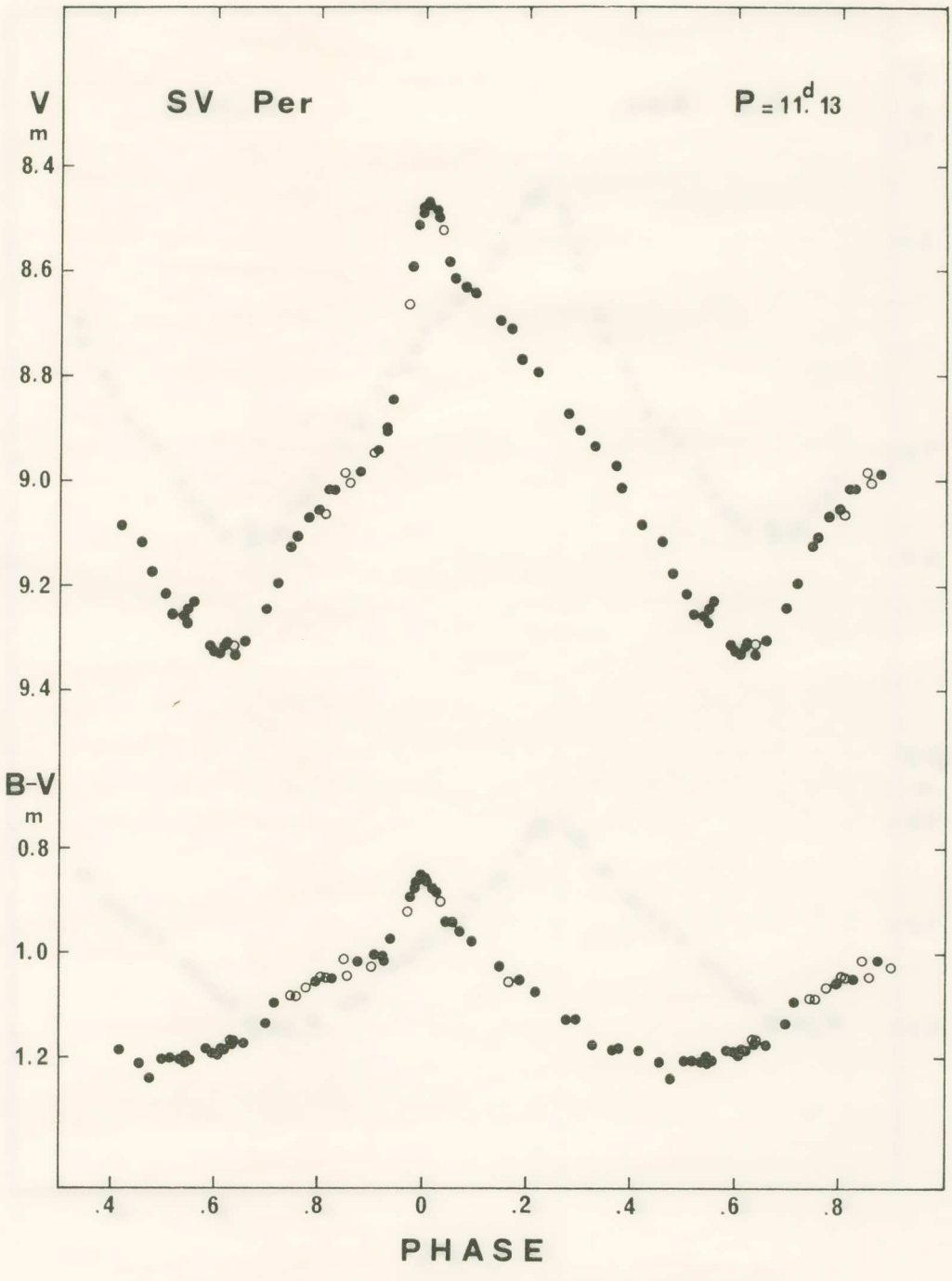

Fig. 10. Light and color curve of the Cepheid SV Per.

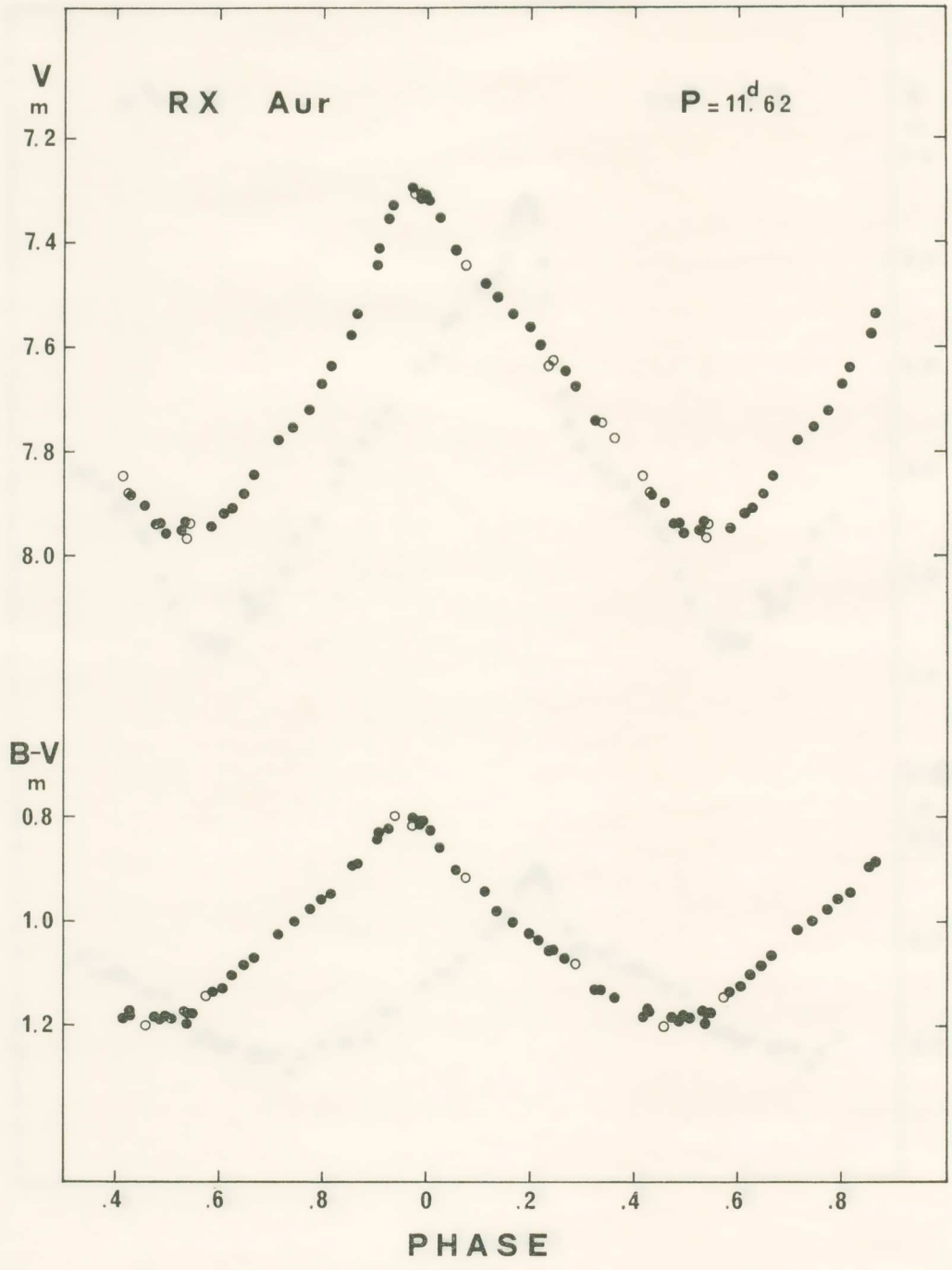

Fig. 11. Light and color curve of the Cepheid RX Aur.

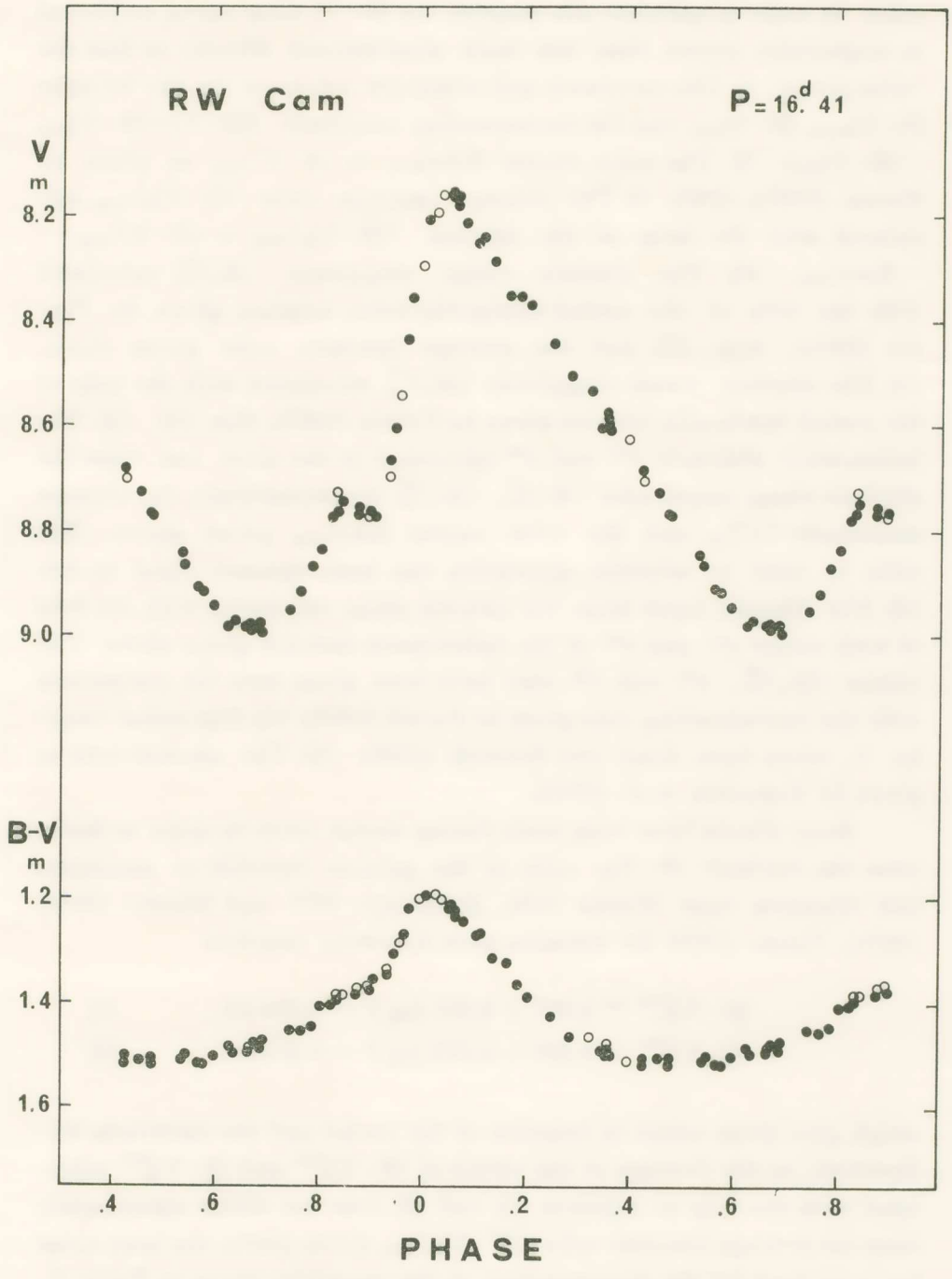

Fig. 12. Light and color curve of the Cepheid RW Cam.

color. In order to calculate this quantity the (B - V) color curve, expressed in magnitudes versus time has been planimetered directly to find the value given. 7) The maximum and minimum values of the (B - V) color $(B-V)_{max}$, $(B-V)_{min}$ and the corresponding amplitude $\Delta(B-V)=(B-V)_{min}-(B-V)_{max}$. 8) The color excess $E_{\langle B-V\rangle_{mag}}$ in $\langle B-V\rangle_{mag}$ as given by Fernie (1967a, 1968). 9) The average intrinsic color $\langle(B-V)_o\rangle_{mag}$ calculated with the help of the relation $\langle(B-V)_o\rangle_{mag}=\langle B-V\rangle_{mag}-E_{\langle B-V\rangle_{mag}}$. 10) The absolute visual magnitude $\langle M_v\rangle^{(1)}_{int}$ calculated with the help of the period-luminosity-color relation given by Fernie (1967b, Equ. 22) and the average intrinsic color given above. 11) The absolute visual magnitude $\langle M_v\rangle^{(2)}_{int}$ calculated with the help of the period-luminosity relation given by Fernie (1967b, Equ. 25). 12) The heliocentric distances $r^{(1)}$ and $r^{(2)}$ calculated in the usual way from the absolute visual magnitudes $\langle M_v\rangle^{(1)}_{int}$, $\langle M_v\rangle^{(2)}_{int}$ correspondingly, the average magnitude $\langle V\rangle_{int}$ and the color excess $E_{\langle B-V\rangle_{mag}}$ given above. The ratio of total to selective absorption has been assumed equal to 3.0. 13) The distance rsinb from the galactic plane calculated with the help of both values $r^{(1)}$ and $r^{(2)}$ of the heliocentric distance given above. The values $\langle M_v\rangle^{(2)}_{int}$, $r^{(2)}$ and $r^{(2)}$ sinb have been given here for comparison with the corresponding data given by Fernie (1968). 14) The radial velocity V_r taken from Kraft and Schmidt (1963). 15) The spectral type as given by Kukarkin *et al.* (1974).

Many efforts have been made during recent years in order to determine the intrinsic $(B-V)_o$ color of the galactic cepheids at maximum and minimum light (Fernie 1970, Makarenko 1971 and Nikolov 1967a, 1967b). Fernie (1970) for example gave following relations

$$(B-V)_o^{max} = 0.297 + 0.307 \log P - 0.194\,\Delta V, \qquad (1)$$

$$(B-V)_o^{min} = 0.238 + 0.373 \log P - 0.373\,\Delta V, \qquad (2)$$

which give these colors as function of the period and the amplitude ΔV. However, as the average of the values of $(B-V)_o^{max}$ and $(B-V)_o^{min}$ calculated with the help of relations (1) and (2) does not differ significantly from the average intrinsic color $\langle(B-V)_o\rangle_{mag}$ given above, the later value has been used for the determination of the quantities given in Table II.

ΠΕΡΙΛΗΨΙΣ

Οἱ συγγραφεῖς ἐξετέλεσαν φωτοηλεκτρικὰς παρατηρήσεις εἰς δύο χρώματα (B, V) διὰ 18 γαλαξιακοὺς κηφείδας μὲ περιόδους περιλαμβανομένας μεταξὺ 2 καὶ 17 ἡμερῶν. Αἱ παρατηρήσεις ἐξετελέσθησαν διὰ τοῦ κατοπτρικοῦ τηλεσκοπίου, διαμέτρου ἀντικειμενικοῦ 72 ἑκ., τοῦ Ἀστεροσκοπείου τῆς Ἀϊδελβέργης. Εἰς προγενεστέραν ἐργασίαν περιεγράφησαν αἱ μέθοδοι παρατηρήσεως καὶ ἀναγωγῆς, αἱ ὁποῖαι ἐχρησιμοποιήθησαν κατὰ τὰς παρατηρήσεις τῶν 18 τούτων κηφειδῶν, καὶ ἐδόθησαν τὰ ἐξαγόμενα τῶν παρατηρήσεων διὰ τοὺς 6 κηφείδας CD Cyg, X, Z, RR Lac, U Vul καὶ TU Cas.

Εἰς τὴν παροῦσαν ἐργασίαν παρέχονται τὰ ἐξαγόμενα τῶν παρατηρήσεων διὰ τοὺς ὑπολειπομένους 12 κηφείδας RT, RX, SY Aur, RW Cam, SU Cas, VZ Cyg, V, Y, BG Lac, RS Ori, SV, AW Per, καθὼς ἐπίσης καὶ μία πρώτη διερεύνησις τοῦ ὑλικοῦ τῶν παρατηρήσεων τοῦ ἀντιστοιχοῦντος εἰς τὸ σύνολον τῶν 18 παρατηρηθέντων ἀστέρων.

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TABLE I

The Cepheid Photometry

SU Cas

Comparison Stars : $+67°234$, $+68°208$

$E = 2430404.134$, $p^{-1} = 0.51299967\ d^{-1}$

JD_{Hel}	Phase	V	B - V	JD_{Hel}	Phase	V	B - V
2435860.376	0.050	5.783	0.672	2436132.563	0.682	6.137	0.817
872.304	.169	5.858	.699	137.398	.163	5.845	.710
874.260	.173	5.870	.703	137.466	.197	5.876	.723
2436080.635	.043	5.777	.669	137.537	.234	5.914	.737
086.526	.065	5.786	.674	138.504	.730	6.108	.800
089.541	.612	6.153	.832	138.577	.767	6.062	.786
089.613	.649	6.155	.815	142.510	.785	6.030	.764
113.488	.897	5.844	.696	142.589	.826	5.951	.725
113.521	.914	5.826	.681 :	144.498	.805	5.989	.753
113.569	.938	5.806	.682	145.558	.349	6.017	.782
113.624	.966	5.789	.670	173.518	.692	6.124	.816
114.486	.409	6.062	.804	174.303	.095	5.786	.674
114.576	.455	6.093	.815	196.465	.464	6.097	.814
116.485	.434	6.088	.809	198.456	.485	6.107	.816
120.514	.501	6.120	.823	199.454	.997	5.783	.669
120.612	.551	6.153	.834	227.339	.302	5.974	.760
121.516	.015	5.762	.675	232.335	.865	5.893	.712
124.537	.565	6.145	.836	233.339	.380	6.041	.794
132.506	.653	6.155	.821	264.312	.269	5.945	.755

Table I (continued)

RT Aur

Comparison Stars : +30° 1232, +30° 1240

E = 2420957.466, p^{-1} = 0,26822156 d^{-1}

JD_{Hel}	Phase	V	B - V	JD_{Hel}	Phase	V	B - V
2435826.538	0.206	5.321	0.643	2436198.391	0.945	5.049	0.464
847.503	.829	5.597	.701	198.551	.988	5.003	.459
856.474	.235	5.351	.674	227.388	.722	5.761	.808
860.499	.315	5.471	.722	227.476	.746	5.745	.796
861.516	.588	5.723	.834	229.362	.252	5.397	.687
867.475	.186	5.298	.629	231.402	.799	5.679	.755
872.444	.519	5.685	.820	232.356	.055	5.095	.500
874.338	.027	5.037	.479	233.424	.341	5.516	.745
891.387	.600	5.742 :	.847 :	238.403	.677	5.761	.816
892.388	.868	5.420	.588	238.534	.712	5.741	.810
900.422	.023	5.032	.472	257.408	.774	5.716	.786
902.391	.551	5.706 :	.816	263.437	.391	5.554 :	.786
909.402	.432	5.625 :	.802 :	264.274	.616	5.732	.832
911.406	.969	4.994	.449	264.410	.652	5.743	.838
919.324	.093	5.145 :	.555 :	277.352	.124	5.203	.575
2436114.618	.475	5.649	.810	278.292	.376	5.555	.766 :
116.619	.012	5.026	.465	278.391	.402	5.572	.761 :
119.615	.815	5.642	.723	279.339	.657	5.747	.838
120.595	.078	5.126	.530	280.347	.927	5.084	.485
121.647	.360	5.538	.765	612.266	.955	5.007	.457
132.579	.292	5.454	.719	612.380	.985	4.996	.461
137.554	.627	5.739	.824	612.467	.009	5.008	.470
137.643	.651	5.752	.837	619.280	.836	5.557	.685
138.591	.905	5.198	.515	619.379	.863	5.437	.623
142.575	.974	5.002	.459	619.452	.882	5.320	.582
145.598	.784	5.712	.774	625.371	.470	5.644	.801
173.477	.262	5.431	.682 :				

Table I (continued)

Y Lac

Comparison Stars : $+50°3588$, $+50°3568$

$E = 2418424.308$, $p^{-1} = 0.23127868\ d^{-1}$

JD_{Hel}	Phase	V	B - V	JD_{Hel}	Phase	V	B - V
2435694.490	0.225	9.036	0.770	2436026.504	0.013	8.771	0.604
700.508	.617	9.398	.910	080.492	.499	9.332	.896
702.465	.069	8.840 :	.648 ::	086.459	.879	9.099 :	.713 :
702.508	.079	8.841 :	.648 ::	091.442	.031		.569 :
726.347	.593	9.387	.914 :	091.453	.034		
732.369	.986	8.750	.601	108.431	.961	8.773	.579 :
732.465	.008	8.759	.608	112.440	.888	9.053	.710 :
732.556	.029	8.779	.611 :	113.420	.114	8.890	.684
740.457	.856	9.209	.778 :	114.384	.337	9.167	.837
741.409	.076	8.827	.646	116.420	.808	9.363	.845
757.379	.770	9.417	.878	120.415	.732	9.442	.893
761.385	.696	9.436 :	.908 :	124.447	.665	9.434	.897
797.354	.015	8.755	.603	137.355	.650	9.418	.896
800.302	.697	9.437	.898	138.427	.898	9.005	.693
826.257	.700	9.436	.898	142.445	.827	9.309	.817 :
827.259	.932	8.857 :	.617 ::	144.334	.264	9.074	.783
2436019.513	.396	9.238	.853	174.259	.185	8.971 :	.739
020.501	.624	9.409	.909	198.319	.750	9.431	.887
024.500	.549	9.368	.894 :	234.248	.059	8.828 :	.695 ::

Table I (continued)

VZ Cyg

Comparison Stars : +42° 4230, +42° 4225

E = 2423507.509, $p^{-1} = 0.205566603\ d^{-1}$

JD_{Hel}	Phase	V	B - V	JD_{Hel}	Phase	V	B - V
2435691.448	0.611	9.191 :	1.085 :	2435800.237	0.974	8.573	0.742
694.389	.216	8.839	0.927 :	868.237	.953	8.576 :	0.733 :
695.391	.422	9.048	1.060	2436019.539	.056	8.634	0.795
700.447	.461	9.076	1.062	022.511	.666	9.212	1.096
702.408	.864	8.847	0.857	025.547	.291	8.916	0.987
707.379	.886	8.764 :	0.824 :	102.442	.098	8.689	0.832 ::
707.391	.888	8.754 :	0.829 :	108.458	.334	8.962	1.021
711.384	.709	9.227	1.070 :	113.402	.351	8.985	1.026
716.384	.737	9.203 :	1.064	114.347	.545	9.141	1.074
716.588	.779	9.152 :	0.998	116.355	.958	8.569	0.738
731.334	.810	9.069 :	0.944 ::	119.338	.571	9.159	1.089
731.360	.816	9.045 :	0.944 ::	120.395	.788	9.132	1.002 :
732.338	.017	8.594	0.763	121.404	.996	8.575	0.755
732.488	.047	8.621	0.792	130.336	.832	8.965 :	0.913 ::
735.356	.637	9.193 :	1.100 :	138.409	.491	9.100	1.064
738.334	.249	8.876 :	0.974 :	145.330	.914		
740.382	.670	9.219	1.091	145.337	.915		0.759
757.336	.155	8.763	0.884 :	145.428	.934	8.593	0.749
761.333	.977	8.562 :	0.752 :	174.225	.854	8.888 :	0.868 :

Table I (continued)

V Lac

Comparison Stars : $+56°2872$, $+55°2809$

E = 2433535.90, $p^{-1} = 0.2006606$ d^{-1}

JD_{Hel}	Phase	V	B - V	JD_{Hel}	Phase	V	B - V
2435707.540	0.763	9.303	1.128	2436113.461	0.215	8.808	0.925
716.624	.585	9.223	1.135 :	114.454	.414	9.060	1.062
726.377	.542	9.191 :	1.114 ::	116.445	.814	9.190	1.040 :
732.437	.758	9.328	1.114	120.455	.618	9.263	1.129
734.373	.147	8.688	0.844	121.450	.818	9.177	1.024
738.362	.947	8.409 :	0.687	124.496	.429	9.073	1.085 :
738.544	.984	8.417 :	0.678	132.442	.024	8.467	0.723
758.344	.957	8.398	0.678	137.430	.025	8.465	0.730
759.471	.183	8.753	0.888	138.475	.234	8.830	0 945
797.385	.791	9.261	1.084	145.450	.634	9.290	1.146
798.360	.987	8.419	0.687	173.400	.242	8.860	0.948
802.336	.784	9.264 :	1.101	174.367	.436	9.112	1.076
855.249	.402	9.063 :	1.056 :	231.249	.850	9.003	0.916
856.247	.602	9.273	1.128 :	232.261	.053	8.521	0.757
859.298	.214	8.820 :	0.954 :	233.275	.257	8.884	0.964
860.256	.407	9.053	1.092 :	539.424	.689	9.326	1.137
868.257	.012	8.453	0.704	540.394	.884	8.729	0.812
872.273	.818	9.214 :	1.010 :	542.416	.289	8.935	1.003
2436020.544	.570	9.211 :	1.128	556.334	.082	8.589	0.795
023.520	.167	8.716 :	0.887	595.259	.893	8.639	0.767
024.539	.372	9.008	1.053	596.259	.093	8.616	0.795
073.438	.184	8.782 :	0.900 :	597.268	.296	8.936 :	0.977 :
089.408	.388			598.264	.496	9.162	1.097
089.463	.399	9.051 :	1.073	599.253	.694	9.322	1.159

Table I (continued)

BG Lac
Comparison Stars : + 42° 4268, + 42° 4275
E = 2426213.548, p^{-1} = 0.18755012 d^{-1}

JD_{Hel}	Phase	V	B - V	JD_{Hel}	Phase	V	B - V
2435691.477	0.587	9.062 :	1.106 :	2436019.494	0.106	8.625	0.888 :
694.423	.139	8.657	0.911	022.531	.676	9.129	1.124 :
695.421	.326	8.853	1.044 :	025.499	.233	8.766	0.987
700.475	.274	8.800	1.017	026.481	.417	8.928	1.080 :
702.439	.643	9.099	1.134	101.430	.473	8.963	1.074 :
720.434	.018	8.552 :	0.835 ::	108.479	.795	9.077	1.067
725.364	.942	8.636	0.849	113.382	.715	9.134	1.130
725.482	.964	8.587	0.839	114.366	.900	8.770	0.914
725.584	.983	8.571	0.815	116.402	.281	8.803	1.024
740.423	.767	9.113	1.097	119.357	.836	8.969	1.010
761.359	.693	9.130	1.133 :	120.321	.016	8.544	0.837
797.321	.438	8.957	1.082	120.433	.037	8.551	0.853
798.328	.627	9.099 :	1.127	121.352	.210	8.732	0.968
800.269	.991	8.534	0.821	138.337	.395	8.912	1.080
825.258	.677	9.127	1.130	142.425	.162	8.686	0.932
826.223	.858	8.892	0.975	144.259	.506	8.997	1.109
827.249	.051	8.571 :	0.853 ::	144.392	.531	9.009	1.127
859.241	.051	8.561 :	0.833 :	200.216	.001	8.548	0.833
2436018.496	.919	8.715	0.889	229.241	.444	8.954	1.101 :

Table I (continued)

AW Per

Comparison Stars : $+36°\,948$, $+37°\,968$

$E = 2416512.64$, $p^{-1} = 0.1547178\ d^{-1}$

JD_{Hel}	Phase	V	B - V	JD_{Hel}	Phase	V	B - V
2435825.509	0.045	7.049	0.903	2436173.497	0.885	7.594	1.112
826.432	.187	7.242	1.010	174.391	.023	7.029	0.899
847.431	.436	7.482	1.156	193.320	.952	7.254	0.968
855.343	.660	7.782	1.202 :	198.437	.743	7.845	1.222
856.382	.821	7.793	1.169	198.540	.759	7.844	1.224
857.390	.977	7.118	0.906	199.490	.906	7.503	1.073
861.449	.605	7.729	1.221	200.350	.039	7.040	0.896
872.377	.296	7.372	1.100	200.517	.065	7.080	0.922 :
874.362	.603	7.730	1.224	227.450	.232	7.301	1.064
911.301	.318	7.401	1.098	229.316	.521	7.649	1.208
919.298	.555	7.697 :	1.221 :	231.419	.846	7.737	1.150
924.299	.329	7.406 :	1.123 ::	232.413	.000	7.043	0.894
2436089.649	.912	7.477	1.071	232.462	.007	7.043	0.899
114.535	.762	7.833	1.222	233.299	.137	7.167	0.983
114.605	.773	7.829	1.214	233.488	.166	7.213	0.998
116.533	.071	7.080	0.924	238.493	.941	7.341	1 011
116.607	.083	7.093	0.938	263.362	.788	7.833	1.211 :
119.537	.536	7.667	1.213	267.341	.404	7.446	1.141
120.556	.694	7.799	1.235	273.373	.337	7.419 :	1.124
121.600	.855	7.707	1.145	277.394	.959	7.225 :	0.961 :
137.619	.334	7.407	1.123	278.301	.100	7.136 :	0.952 :
138.523	.473	7.551	1.173	279.304	255	7.336 :	1.071 :
144.522	.402	7.447	1.128	295.309	.731	7.847 :	1.246 :

Table I (continued)

RS Ori

Comparison Stars : $+14^{\circ}1260$, $+15^{\circ}1160$

E = 2425523.00, $p^{-1} = 0.1321561\ d^{-1}$

JD Hel	Phase	V	B - V	JD Hel	Phase	V	B - V
2435847.536	0.450	8.556	1.137	2436199.574	0.974	8.033	0.805 :
856.495	.634	8.756	1.232	200.403	.084	8.112	0.879
860.479	.161	8.214	0.951	229.384	.914	8.288	0 914
861.365	.278	8.232	0.973 .	231.322	.170	8.225	0.959
868.427	.211	8.240	0.954	231.481	.191	8.235	0.963
872.420	.739	8.808	1.197	232.318	.302	8.252	0.994
874.391	.999	8.015	0.819	232.452	.319	8.276	1.005
891.352	.241	8.219	0.978 :	233.363	.440	8.551	1.152
892.342	.372	8.412	1.084	233.440	.450	8.568	1.146
896.336	.900	8.361	0.958 :	257.385	.614	8.746	1.224 :
900.366	.432	8.534	1.142	264.294	.528	8.628	1.179
902.332	.692	8.817	1.255	267.324	.928	8.197	0.881
911.384	.888	8.396	0.974 :	273.398	.731	8.819 :	1.219
924.322	.598	8.717	1.219 ::	277.385	.258	8.223	0.964
2436114.638	.750	8.787	1.199	278.324	.382	8.441	1.084
116.639	.014	8.014	0.819	280.327	.646	8.780	1.244
119.636	.410	8.491	1.134	597.383	.547	8.652	1.199
120.627	.541	8.629	1.196	599.287	.799	8.701	1.144
121.667	.678	8.800	1.242	599.440	.819	8.644	1.098
132.597	.123	8.165	0.922	603.378	.340	8.301	1.035
137.599	.784	8.733	1.149	604.380	.472	8.574	1.155
138.643	.922	8.211	0.890 :	607.335	.862	8.498	1.015
144.612	.711	8.814	1.230 :	612.316	.521	8.624	1.188
145.631	.845	8.560	1.050	616.375	.057	8.056	0.850
145.659	.849			625.328	.240	8.212	0.977
199.392	.950	8.099	0.839	627.315	.503	8.592	1.177
199.475	.961	8.058	0.830				

Table I (continued)

SY Aur

Comparison Stars : + 42° 1192, + 42° 1190

E = 2423757.170, $p^{-1} = 0.0985800529\ d^{-1}$

JD_{Hel}	Phase	V	B - V	JD_{Hel}	Phase	V	B - V
2435826.503	0.795	9.010	1.001	2436232.435	0.812	8.956	0.982
847.459	.861	8.860	0.944	233.472	.915	8.830	0.935
856.442	.747	9.159	1.055	235.413	.106	8.788:	0.958::
860.458	.143	8.884	0.969 :	238.515	.412	9.225	1.194
861.492	.245	9.040:	1.098	257.346	.268	9.043:	1.116
872.395	.320	9.107	1.143	263.329	.858	8.863	0.945
874.434	.521	9.329	1.226	278.371	.341	9.136	1.164
892.363	.288	9.076	1.129	279.319	.434	9.250	1.210
900.402	.080	8.754	0.936	280.305	.531	9.333	1.230
911.363	.161	8.923	1.039 :	281.317	.631	9.319	1.183
2436113.606	.098	8.773	0.952	284.375	.933	8.806	0.940::
114.592	.195	8.969	1.058 :	286.321	.124	8.825	0.973
116.569	.390	9.197	1.186	295.326	.012	8.722	0.891
119.596	.689	9.268	1.129	539.462	.079	8.740	0 935 :
120.576	.785	9.042	1.020	595.302	.584	9.341	1.218
121.629	.889	8.849	0.925 :	595.459	.599	9.337	1.201
132.535	.964	8.778	0.922	596.478	.700	9.239	1.120
132.613	.972	8.768	0.906	597.360	.787	9.027	1.030
137.522	.456	9.271	1.224	598.374	.887	8.846	0.958
138.628	.565	9.338	1.212	605.382	.577	9.345	1.223
142.558	.952	8.786	0.938	608.402	.875	8.845	0.951
173.454	.998	8.743	0.901	613.356	.363	9.162	1.172
173.560	.008	8.723	0.908	618.336	.854	8.871	0.954
198.521	.469	9.285	1.223	626.370	.646	9.305	1.200
199.366	.552	9.348	1.212	628.313	.838	8.906	0.958::
200.381	.652	9.310:	1.151 :	630.317	.036	8.714	0.904::
229.341	.507	9.321	1.232	630.368	.041		
231.459	.716	9.219	1.093	630.389	.043	8.713	0.909

Table I (continued)

SV Per

Comparison Stars : +42° 1067, +42° 1063

E = 2419055.145, p^{-1} = 0.089857351 d^{-1}

JDHel	Phase	V	B - V	JDHel	Phase	V	B - V
2435798.539	0.517	9.255	1.203	2436199.343	0.532	9.260	1.206
799.514	.605	9.332	1.190	199.559	.552	9.288	1.202
802.535	.876	8.981	1.018	200.489	.635	9.333	1.173 :
825.467	.937	8.848	0.972	227.430	.056	8.619	0.947
826.403	.021	8.500	0.888	231.437	.416	9.086	1.188
839.407	.189	8.770	1.054	232.374	.500	9.218	1.204
847.371	.905	8.940	1.003	233.318	.585	9.318	1.187
856.422	.718	9.199	1.099	233.458	.598	9.325	1.189
857.436	.809	9.064 :	1.048 ::	235.373	.770		
868.395	.794	9.055	1.054	235.426	.775	9.070	1.068 :
872.330	.148	8.696	1.024	238.428	.044	8.587	0.941
874.313	.326	8.935	1.178	257.329	.743	9.123	1.084 :
891.321	.854	9.006 :	1.047 :	257.446	.753	9.109	1.088 :
902.357	.846	8.988 :	1.013 :	264.387	.377	9.017	1.181
909.350	.474	9.174	1.240	277.368	.543	9.271	1.199
911.339	.653	9.309	1.175	278.344	.631	9.316 :	1.164 :
2436113.555	.824	9.015	1.050	281.339	.900	8.946 :	1.028 :
116.550	.093	8.642	0.980	284.307	.167	8 711	1.051 :
119.556	.363	8.970	1.188	556.430	.619	9.310	1.185
120.536	.451	9.114	1.210	604.332	.923	8.905	1.003
121.560	.543	9.246	1.210	605.277	.008	8.472	0.864
124.584	.815	9.019	1.049 :	605.403	.020	8.485	0.879
137.483	.974	8.591	0.899	615.469	.924	8.900	1.016
137.634	.987	8.513	0.874	616.285	.998	8.481	0.861 :
138.562	.071	8.631	0.960	616.322	.001		
144.589	.612	9.314	1.183	616.391	.007	8.470	0.857
145.501	.694			627.292	.987	8.512	0.864
145.539	.698	9.247	1.134	627.411	.997	8.486	0.852
173.540	.214	8.791	1.073	649.296	.964	8.668 :	0.922 ::
174.432	.294	8.902	1.124	672.316	.032	8.523 :	0.904 ::
196.488	.276	8.871	1.129				

Table I (continued)

RX Aur

Comparison Stars : $+39^{\circ}1122$, $+40^{\circ}1125$

$E = 2430079.020$, $p^{-1} = 0.08602299\ d^{-1}$

JD_{Hel}	Phase	V	B - V	JD_{Hel}	Phase	V	B - V
2435825.550	0.334	7.747 :	1.131	2436227.371	0.900		
826.467	.413	7.848 :	1.182	227.411	.903	7.434	0.843
847.409	.214	7.593	1.034	227.476	.909	7.408	0.833
856.401	.988	7.314	0.805	231.303	.238	7.632 :	1.059
857.416	.075	7.444 :	0.914 :	232.284	.322	7.741	1.132
861.473	.424	7.872 :	1.177	233.503	.427	7.879	1.177
872.372	.361	7.777 :	1.149	238.472	.854	7.574	0.896
874.413	.537	7.968 :	1.177	257.307	.475	7.939	1.181
900.384	.771	7.720	0.974	257.425	.485	7.939	1.188
909.372	.544	7.940 :	1.177	263.271	.988	7.303	0 817
911.321	.712	7.778	1.024	263.348	.994	7.310	0.807
2436113.584	.111	7.477	0.946	263.458	.004	7.320	0.824
114.564	.196	7.560	1.023	274.302	.937	7.327	0.792 :
119.574	.627	7.904	1.103	274.358	.941		
121.581	.799	7.664	0.958	278.355	.285	7.676	1.086 :
124.560	.055	7.413	0.902	280.289	.452	7.902	1.206 :
132.547	.742	7.751	1.000	281.296	.538	7.932	1.190
137.502	.169	7.537	1.004	286.319	.970	7.295	0.817 :
138.610	.264	7.649	1.072	596.453	.649	7.880	1.082
142.606	.608	7.918	1.127	598.395	.816	7.635	0.945
145.618	.867	7.532	0.889	607.309	.583	7.942	1.134
193.338	.972	7.306 :	0.801	608.278	.666	7.849	1.070
196.509	.245	7.628 :	1.056	611.264	.923	7.354	0.821
199.413	.495	7.953	1.181	612.404	.021	7.351	0.860
199.540	.505		1.186	618.313	.530	7.953	1.172
200.367	.577		1.147 :	625.350	.135	7.504	0.981

Table I (continued)

RW Cam

Comparison Stars : + 58° 670, + 58° 672

E = 2428575.07, p^{-1} = 0.0609272654 d^{-1}

JD_{Hel}	Phase	V	B - V	JD_{Hel}	Phase	V	B - V
2435740.595	0.576	8.914	1.514	2436144.549	0.188	8.354	1.366
741.632	.639	8.976	1.496	145.578	.250	8.445	1.424
758.484	.666	8.981	1.485:	173.427	.947	8.604	1.308
793.539	.802	8.833	1.405	174.411	.007	8.210	1.196
798.502	.104	8.257	1.271	199.435	.532	8.842	1.505
799.485	.164	8.358	1.327	229.295	.351	8.585	1.487
802.460	.345	8.605	1.490	229.403	.358	8.593	1.476 :
825.419	.744	8.952	1.451	231.378	.478	8.772	1.505
839.385	.595	8.947	1.501	232.393	.540	8.867	1.500
847.347	.080	8.215	1.242	238.273	.898	8.766 :	1.370 :
855.319	.566	8.910	1.514	238.453	.909	8.774	1.352
856.359	.629	8.981	1.483	245.286	.325	8.536	1.461 :
857.365	.690	8.998	1.473	257.277	.056	8.165	1.212
860.403	.875	8.769	1.376:	257.364	.061	8.183	1.231
861.401	.936	8.667	1.343	263.305	.423	8.688	1.505
868.374	.361	8.602	1.495	267.362	.670	8.990	1.480
874.279	.721	8.969	1.462	273.323	.034	8.169 :	1.203 ::
902.303	.428	8.704:	1.515	279.291	.397	8.629 :	1.512 :
911.281	.975	8.354	1.220	598.352	.837	8.765	1.392
2436089.562	.837	8.728:	1.386:	599.361	.898	8.763	1.378
089.628	.841	8.741	1.388:	600.307	.956	8.548 :	1.284 ::
113.355	.287	8.501	1.461	601.370	.021	8.196 :	1 194 :
114.516	.358	8.577	1.491	603.319	.139	8.288	1.316
116.504	.479	8.770	1.518	604.355	.202	8.370	1.389
119.506	.662	8.980	1.495	612.288	.686	8.977	1.487
121.538	.786	8.870	1.445	615.366	.873		
124.518	.967	8.437	1.270	615.447	.878	8.753	1.387
132.486	.453	8.725	1.509	616.357	.934	8.694 :	1.334 ::
137.578	.763	8.918	1.455	617.291	.991	8.294 :	1.203 ::
138.542	.822	8.777	1.403	618.281	.051	8.157	1.219
142.537	.065	8.166	1.227	619.297	.113	8.240	1.268

T A B L E

Fundamental data for the 18 Cepheids

Star	Period	log P	l	b	$\langle V \rangle_{int}$	V_{max}	V_{min}	ΔV	$\langle B-V \rangle_{mag}$	$(B-V)_{max}$	$(B-V)_{min}$
SU Cas	1.949	0.290	133°.47	+8°.51	5.964	5.768	6.159	0.391	0.755	0.669	0.830
RT Aur	3.728	0.571	183 .14	+8 .90	5.428	4.998	5.757	0.759	0.690	0.455	0.836
Y Lac	4.324	0.636	98 .71	−4 .03	9.128	8.750	9.440	0.690	0.793	0.601	0.906
VZ Cyg	4.865	0.687	91 .52	−8 .51	8.912	8.570	9.225	0.655	0.956	0.736	1.100
V Lac	4.983	0.697	106 .46	−2 .58	8.900	8.404	9.329	0.925	0.971	0.679	1.156
BG Lac	5.332	0.727	92 .97	−9 .26	8.849	8.540	9.132	0.592	1.012	0.820	1.130
X Lac	5.445	0.736	106 .56	−2 .51	8.382	8.170	8.556	0.386	0.955	0.842	1.047
RR Lac	6.416	0.807	105 .64	−2 .01	8.817	8.423	9.192	0.769	0.968	0.728	1.139
AW Per	6.463	0.810	166 .61	−5 .40	7.443	6.982	7.837	0.855	1.105	0.894	1.238
RS Ori	7.567	0.879	196 .57	+0 .34	8.395	8.014	8.821	0.807	1.049	0.815	1.253
U Vul	7.991	0.903	56 .07	−0 .28	7.089	6.770	7.435	0.665	1.365	1.163	1.531
SY Aur	10.144	1.006	164 .74	+2 .13	9.031	8.712	9.345	0.633	1.075	0.900	1.233
Z Lac	10.886	1.037	105 .76	−1 .63	8.388	7.863	8.807	0.944	1.208	0.876	1.433
SV Per	11.129	1.046	162 .59	−1 .52	8.937	8.473	9.323	0.850	1.089	0.856	1.210
RX Aur	11.624	1.065	165 .77	−1 .29	7.648	7.300	7.962	0.662	1.023	0.804	1.190
RW Cam	16.414	1.215	144 .85	+3 .79	8.603	8.157	8.987	0.830	1.410	1.195	1.510
CD Cyg	17.071	1.232	71 .07	+1 .43	8.938	8.321	9.460	1.139	1.439	0.945	1.705

observed but the anomalous cepheid TU Cas

Δ (B-V)	$E_{\langle B-V\rangle_{mag}}$	$\langle (B-V)_o \rangle_{mag}$	$\langle M_V \rangle_{int}^{(1)}$	$\langle M_V \rangle_{int}^{(2)}$	$r^{(1)}$ (kpc)	$r^{(2)}$ (kpc)	$(r \sin b)^{(1)}$ (pc)	$(r \sin b)^{(2)}$ (pc)	V_r km/sec	Spectrum
0.161	0.30	0.455	— 2.227	— 2.570	0.29	0.34	43	50	— 7.8	F4Ib-II-F7Ib-II
0.381	0.13	0.560	— 3.055	— 3.193	0.42	0.44	65	68	+ 21.0	F4 Ib - G1 Ib
0.305	0.16 :	0.633	— 3.204	— 3.346	2.35	2.50	— 165	— 176	— 18.0	F5 - G0
0.364	0.4	0.556	— 3.360	— 3.468	1.64	1.72	— 242	— 255	— 16.5	F5 - G0
0.477	0.33	0.641	— 3.394	— 3.492	1.82	1.91	— 82	— 86	— 20.0	F5 - G0
0.310	0.37	0.642	— 3.498	— 3.565	1.77	1.82	— 285	— 293	— 19.5	F7 - G4
0.205	0.38	0.575	— 3.500	— 3.587	1.41	1.46	— 62	— 64	— 25.0	F6 - G0
0.411	0.29	0.678	— 3.707	— 3.763	1.95	2.20	— 68	— 77	— 34.5	F6 - G2
0.344	0.3	0.805	— 3.795	— 3.770	1.17	1.16	— 110	— 109	+ 13.5	F6 - G0
0.438	0.37 :	0.679	— 3.95?	— 3.945	1.77	1.76	111	10	+ 40.5	F5 Ib - G1 Ib
0.367	0.65	0.705	— 4.378	— 4.007	0.80	0.67	— 4	— 3		F8 Iab - G2
0.333	0.46	0.615	— 4.331	— 4.276	2.49	2.43	93	90	— 2.0	F5 - F8
0.557	0.42	0.788	— 4.542	— 4.359	2.16	1.98	— 61	— 56	— 25.0	F6 Ib - G6 Ib
0.354	0.42	0.669	— 4.456	— 4.383	2.67	2.58	— 71	— 68	— 9.0	F6 - G1
0.386	0.40	0.623	— 4.467	— 4.434	1.52	1.50	— 34	— 34	— 21.3	F6 - G2
0.315	0.70	0.710	— 5.344	— 4.847	2.34	1.86	155	123	— 26.0	F5 - G1
0.760	0.55	0.889	— 5.446	— 4.895	3.52	2.74	— 88	— 68	— 10.3	F8 Ib - K0 Ib

Ὁ Ἀκαδημαϊκὸς κ. **Ἰωάννης Ξανθάκης,** παρουσιάζων τὴν ἀνωτέρω ἀνακοίνωσιν, εἶπε τὰ ἑξῆς :

Κύριε Πρόεδρε,

Ἔχω τὴν τιμὴν νὰ παρουσιάσω εἰς τὴν Ἀκαδημίαν Ἀθηνῶν ἐργασίαν τῶν κ. K. Bahner καὶ Λ. Μαυρίδου, ὑπὸ τὸν τίτλον «Φωτοηλεκτρικὴ Φωτομετρία καταλλήλως ἐπιλεγομένων γαλαξιακῶν κηφειδῶν».

Οἱ κηφεῖδαι εἶναι μία εἰδικὴ κατηγορία ἀστέρων ποὺ ἔλαβον τὸ ὄνομα τοῦτο ἀπὸ τὸν ἀστέρα δ τοῦ ἀστερισμοῦ τοῦ Κηφέως. Οἱ ἀστέρες οὗτοι εἶναι μεταβλητοὶ ἀστέρες, ἡ δὲ λαμπρότης των μεταβάλλεται ἐντὸς βραχείας περιόδου περιλαμβανομένης μεταξὺ μιᾶς καὶ πεντήκοντα ἡμερῶν.

Ἀπὸ τῆς ἐποχῆς τῆς ἀνακαλύψεώς των οἱ κηφεῖδαι παρατηροῦνται συνεχῶς ὑπὸ τῶν ἀστρονόμων, διότι ἡ μελέτη των μᾶς ἐπιτρέπει νὰ προσδιορίσωμεν τὰς ἀποστάσεις αὐτῶν τόσον ἐντὸς τοῦ Γαλαξίου μας ὅσον καὶ μεταξὺ τοῦ Γαλαξίου μας καὶ τῶν λοιπῶν γαλαξιῶν καὶ νὰ λάβωμεν οὕτω τὴν κλίμακα τῶν διαστάσεων τοῦ προσιτοῦ εἰς τὴν παρατήρησιν τμήματος τοῦ Σύμπαντος.

Ἐπὶ πλέον, ἡ μελέτη τῶν κηφειδῶν μᾶς παρέχει πολυτίμους πληροφορίας διὰ τὴν δομὴν καὶ τὴν ἐξέλιξιν τῶν ἀστέρων ἐν γένει, δεδομένου ὅτι, συμφώνως πρὸς τὰς συγχρόνους ἀντιλήψεις, ὅλοι οἱ ἀστέρες τῶν ὁποίων ἡ μᾶζα περιλαμβάνεται μεταξὺ ὡρισμένων ὁρίων καθίστανται κατὰ τὴν διάρκειαν τῆς ἐξελίξεώς των καὶ ἐπὶ ἓν χρονικὸν διάστημα «Κηφεῖδαι». Διὰ νὰ καταστῇ δὲ δυνατὴ ἡ συστηματικὴ μελέτη τῶν διαφόρων προβλημάτων ποὺ συνδέονται μὲ τοὺς κηφείδας εἶναι ἀπαραίτητον νὰ διαθέτωμεν λεπτομερεῖς καὶ λίαν ἀκριβεῖς καμπύλας φωτὸς αὐτῶν εἰς διάφορα χρώματα, ἤτοι εἰς ἀκτινοβολίας διαφόρων μηκῶν κύματος.

Εἰς τὸν τομέα τοῦτον εἰργάσθησαν οἱ κ. Bahner καὶ Μαυρίδης οἱ ὁποῖοι προέβησαν, διὰ τοῦ ἀνακλαστικοῦ τηλεσκοπίου τῶν 72 ἑκ. τοῦ Ἀστεροσκοπείου τῆς Ἀϊδελβέργης, εἰς τὸν φωτοηλεκτρικὸν προσδιορισμὸν λεπτομερῶν καὶ λίαν ἀκριβῶν καμπυλῶν φωτὸς εἰς δύο χρώματα, κυανοῦν καὶ ἰῶδες. Οἱ προσδιορισμοὶ δὲ τῶν καμπυλῶν φωτὸς ἀναφέρονται εἰς 18 γαλαξιακοὺς κηφείδας μὲ περιόδους περιλαμβανομένας μεταξὺ δύο καὶ δεκαεπτὰ ἡμερῶν.